1995-96 KIRIS OPEN-RESPONSE ITEM SCORING WORKSHEET

Grade 4 — Mathematics Question 2

The academic expectations addressed by this item include:

1.5 -1.9 Students use mathematical ideas and procedures to communicate, reason, and solve problems.

2.10 Students understand measurement concepts and use measurements appropriately and accurately.

The core content assessed by this item includes:

Number/Computation Concept
- Students should understand whole numbers, fractions, and decimals.

Geometry/Measurement Concept
- Students should understand basic two-dimensional shapes such as squares, triangles, rectangles, and circles.

Geometry/Measurement Skill
- Students should be able to use standard and nonstandard units to measure length, area, liquid capacity, volume, money, time, temperature, and weight.

2. Mowing the Yard

The shaded area of the picture below shows what part of the yard Jessie mowed in 30 minutes.

She wonders about how long it takes her to mow the WHOLE yard. Write a note to Jessie

a. telling her about how long it takes to mow her WHOLE yard, and
b. explaining to her how you found your answer.

Be sure to include a drawing of the yard in your explanation.

SCORING GUIDE

Score	Description
4	Correct response. Clear explanation includes drawing.
3	Correct response. Vague but correct explanation includes drawing.
2	Shows definite understanding of relation between time spent mowing the portion of yard and time required for entire yard.
1	Shows minimal understanding of problem.
0	Response incorrect or irrelevant.
Blank	Blank/no response

Correct answer: about 4 hours. (Except for a 4-rating, do not penalize the students for answering how much **more** time it will take (about 7 half hours or 3 1/2 hours) instead of how much time in all. Intent of student must be clear, however.)

NOTE: Students may work with 30 minutes as 1/2 hour. They may use multiplication or repeated addition to find total time, or may just indicate intuitively that 8 one-half hours is 4 hours.

KIRIS ASSESSMENT ANNOTATED RESPONSE
GRADE 4 MATHEMATICS

Sample 4-Point Response of Student Work

Drawing and explanation clearly show an effective strategy for using information given to solve problem.

A. Dear Jessie

I think it will take about 4 hours to mow your yard. B. Because it takes thirty minutes to mow 1/8 of it so it would take 4 hours.

30 min.	30 min.	30 min.	30 min.
30 min.	30 min.	30 min.	30 min.

30 min
x 8
240 min. = 4 hours

Student accurately estimates/measures the fraction of the rectangle that is shaded.

Student uses computation to support conversion of time measure of minutes to hours.

Student relates the fraction 1/8th of the lawn to the whole lawn.

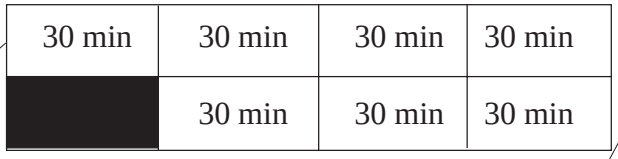
Student "tiles" the rectangle representing the entire lawn with the rectangle representing the mowed portion of the lawn.

KIRIS ASSESSMENT ANNOTATED RESPONSE
GRADE 4 MATHEMATICS

Sample 3-Point Response of Student Work

Student provides clear and complete explanation of a correct strategy.

If Jessie mows the rest of the yard it will take 3 hours and 30 minutes to mow the rest of the yard. The way I figured this answer out is I made more boxes like the black one. I put 30 in all of them so I knew it would take you 30 minutes to mow that much of your yard. This is what it looks like:



Drawing is accurate.

Student calculates the time it will take to mow the **remainder** of the yard rather than the **whole** yard, as directed; answer is incorrect for the question but demonstrates a clear grasp of estimation/measurement strategies.

KIRIS ASSESSMENT ANNOTATED RESPONSE
GRADE 4 MATHEMATICS

Sample 2-Point Response of Student Work

Explanation is minimally correct but lacks clarity and detail that would show evidence of and communicate a more complete understanding of concept.

Jessie it will take 5 hours and 30 minutes to mow your yard. I found out my answer by going across the rest of the yard.

30 min	30 min	30 min	30 min
30 min	30 min	30 min	30 min

Student's drawing is correct and shows understanding of estimation/ measurement strategy.

Student's calculation of time needed to mow the yard is incorrect and shows weak grasp of using measurable attributes to estimate unknowns.

Sample 1-Point Response of Student Work

Student shows some understanding that the quantity given (30 minutes) must be multiplied to answer the problem.

a.) It will take her about two and a half hours to mow the yard
b.) You have to count thirty minutes four times.

Drawing does not show understanding of estimation/measurement strategy.

Explanation does not clarify how/ where the student derived "four times."

INSTRUCTIONAL STRATEGIES

Mowing the Yard

Familiarize students with time measurement system, connect one measurement system with another, as time with area, and work with dividing geometric figures into areas representing fractional parts as with rods, tangram pieces.

- Concept of area..use color tiles to develop concept
- Fractional parts of whole...use pattern block fractions
- time...minutes in an hour
- multiplication...use repeated addition on calculator, constant key
- explore basic estimation strategies
- diagram as a representation, Addenda Series K-6 Geometry p.9 Part I "Get Going"

Use KIRIS-like open response questions in classroom instruction and assessment. Model strategies for explaining work to fellow mathematicians. Model and have students develop and use scoring guides with open response items. Encourage students to explore highlighting and underlining strategies as organizers, stressing that only evidence found in Student Response Book is scored on KIRIS open responses.

Infuse lessons with the use of a variety of instructional approaches and strategies:

- use mathematical tools, manipulatives, hands on activities, cooperative group work, higher order thinking skills, video tapes, multiple intelligences approaches, mappings, graphic organizers, etc.

Explore appropriate use of calculators, both as tools and instruments for checking work.

REFERENCES

TRANSFORMATIONS Kentucky's Curriculum Framework
Academic Expectations 1.5-1.9 and 2.7 through 2.13
KDE's Core Content for Assessment
Mathematics, examine curriculum alignment from P through 12
KDE's web site at http://www.kde.state.ky.us
explore curriculum pages, examine units of study, etc.
Curriculum and Evaluation Standards for School Mathematics,
Professional Standards for Teaching Mathematics, Assessment
Standards for School Mathematics, and *Addenda Series* from NCTM.
Telephone: 703-620-9840, web site at http://www.nctm.org
KDE's Primary Performance Tasks
Telephone: 800-547-4799, KIRIS Service Center